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Department of Mechanical Sciences
July 12, 1966

Headquarters
National Aeronautics and Space Administration
Washington, D. C. 20546

Reference: Contractor: Southwest Research Institute
Principal Investigator: U. S. Lindholm
Contract No. NASr-94(06)
Quarterly Progress Report No. 9
Period Covered: 1 April 1966 through 30 June 1966
SwRI Project No. 02-1504

Gentlemen:

During the reporting period the formal contract extension for one additional year of effort was received. We have also submitted Technical Report No. 6 titled, "A Study of Joint Discontinuity in Vibrations of Composite Shells," by W. C. L. Hu. This report covers the work accomplished on the free-vibrations of composite cone-cylinder shell configurations. Fundamental difficulties in treating shells with geometrical discontinuities are discussed in detail along with some experimental results. A satisfactory analytical solution for this type of problem remains to be achieved and hinges on a better understanding and analysis of the boundary-layer region enclosing the joint or discontinuity.

This year's effort will include an experimental study of the free vibrations of a toroidal shell and a general study of the vibration characteristics of discretely stiffened cylindrical shells. Mr. John Mixson of NASA Langley Research Center visited SwRI on 30 June to review this work and to see our experimental facilities. We feel such visits are of considerable benefit to the program.

The toroidal shell is being constructed by chemically plating nickel on a mandrel which can subsequently be removed. A complete vibration survey of this model will be made for comparison with existing analysis.

The study of stiffened shells will concentrate on the effects of the relative stiffness and spacing of discrete stiffeners on the free vibration characteristics of cylindrical shells. Analytical effort on this problem has already been initiated. Experimental work will also be started shortly.

Respectfully submitted,

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USL/ddn
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